

*REMARKS/ARGUMENTS*

The amendments set out above and the following remarks are responsive to the points raised by the Office Action dated September 29, 2005. In view of the amendments set out above and the following remarks, reconsideration is respectfully requested.

*Priority under 35 U.S.C. § 119*

This patent application claims priority from Japanese patent application 2002-203987 filed July 12, 2002. The Examiner recognized the priority claim but stated that the priority document had not been received. The priority document was filed with the application and that forty-page document appears in the image file wrapper with a filing date of July 11, 2003. Acknowledgement of receipt of the priority document in the next communication is respectfully requested.

*The Pending Claims*

In this amendment, claims 5 and 7 have been cancelled, so that claims 1-4, 6, and 8-13 are pending. Claims 1, 2, 6, and 8 have been amended to describe the invention more clearly. Claims 10 and 13 have been amended to restore a term so that each claim term has proper antecedent basis. No new matter has been added, and the basis for the amended claim language may be found within the original specification, claims and drawings.

Claims 1 and 2 have been amended to include the limitations of claim 5, which has been cancelled. The amendments to claims 1 and 2 find support at, for example, page 8, line 30 – page 9, line 2; page 11, lines 3-4; and page 11, lines 16-24 of the specification, and by original claim 5.

Claim 6 has been amended to include the limitations of claim 7, which has been cancelled. The amendments to claims 6 and 8 find support at, for example, page 13, line 28 to page 14, line 10; page 8, line 30 – page 9, line 2; page 14, line 30 – page 15, line 6; and page 16, lines 1-10 of the specification.

*Rejections under 35 U.S.C. § 102*

Claims 1-13 were rejected under 35 U.S.C. § 102 as anticipated by U.S. Patent No. 5,968,848 to Tanabe et al. (hereinafter, “Tanabe ‘848”); U.S. Patent Application Publication No. 2004/0152608 to Hsu (hereinafter, “Hsu”); U.S. Patent No. 6,372,410 to Ikemoto et al.

(hereinafter, "Ikemoto"); U.S. Patent No. 6,773,873 to Seijo et al. (hereinafter, "Seijo"); U.S. Patent No. 5,792,274 to Tanabe et al. (hereinafter, "Tanabe '274"); U.S. Patent No. 6,068,000 to Tanabe et al. (hereinafter, "Tanabe '000"); and U.S. Patent No. 5,905,063 to Tanabe et al. (hereinafter, "Tanabe '063"). It is noted that the disclosures of Tanabe '274 and Tanabe '063 are apparently identical.

Each of these rejections is separately and respectfully traversed.

Amended claims 1 and 2 recite a cleaning composition with a pH of 4-8 including, *inter alia*, a salt of hydrofluoric acid and a base not containing a metal (A component) in an amount of 0.01 – 1 mass %, and at least one acid selected from the group consisting of organic acids and inorganic acids (C component). The pH of the claimed cleaning composition is adjusted to 4-8 by the claimed C component (e.g., page 10, line 33 to page 11, line 2). These features provide a cleaning composition that effectively prevents corrosion on copper interconnections and interlayer insulating film and which efficiently removes resist film, resist residue, and etching residue (see, e.g., page 4, line 28 to page 5, line 2; page 8, line 30 to page 9, line 2 and page 10, line 27 to page 11, line 10 of the specification).

In contrast, Tanabe '848, Tanabe '274, Tanabe '063, and Tanabe '000 describe various anticorrosives (Tanabe '848: col. 6, line 55 to col. 7, line 32; Tanabe '274: col. 4, line 62 to col. 5, line 45; Tanabe '063: col. 4, line 64 to col. 5, line 42; Tanabe '000: col. 3, line 52 to col. 4, line 29) and also disclose that the pH is adjusted to 5-8 in accordance with the kind and concentration of the salt not containing a metal (Tanabe '848: col. 4, line 56 to col. 5, line 12; Tanabe '274: col. 3, line 49 to col. 4, line 4; Tanabe '063: col. 3, line 51 to col. 4, line 6; Tanabe '000: col. 5, lines 8-39). However, these references fail to disclose the claimed C component serving as a pH adjuster. Accordingly, neither Tanabe '848, Tanabe '274, Tanabe '063, nor Tanabe '000 anticipate amended independent claim 1 or 2.

Ikemoto describes various anticorrosives (col. 3, line 66 to col. 4, line 33). However, Ikemoto does not disclose the effects of the anticorrosives on the pH of the resist stripping composition of Ikemoto. In contrast to Ikemoto, the claimed C component serves as the pH adjuster in the claimed cleaning composition. Accordingly, amended independent claims 1 and 2 are not anticipated by Ikemoto.

Hsu discloses a cleaning composition that is strongly alkaline ([0012]), which differs from the presently claimed pH of 4-8. In Hsu, the inclusion of tetraalkylammonium hydroxides in the cleaning composition forms  $[(R)_4N]_p[X]_q$  ([0012]). In contrast, the

cleaning compositions of claims 1 and 2 only require the claimed A component and do not require the formation of  $[(R)_4N]_p[X]_q$ . Accordingly, Hsu does not anticipate amended independent claim 1 or 2.

Seijo discloses that organic acids are added as a buffering agent to suppress the variation of the pH of the cleaning formulation (col. 4, lines 41-46). Thus, the organic acids described in Seijo either prevent or minimize the variation of the pH of the cleaning formulation. In contrast to the prevention or minimization of the pH variation in Seijo, the presently claimed C component changes the pH of the cleaning composition and adjusts it to a desired level. Accordingly, Seijo does not anticipate either of amended independent claims 1 and 2.

For the reasons set forth above, neither Tanabe '848, Tanabe '274, Tanabe '063, Tanabe '000, Ikemoto, Hsu, nor Seijo anticipate amended independent claims 1 and 2, and the § 102 rejection should be withdrawn.

Amended independent claims 6 and 8 recite a cleaning composition having a pH of 2-8 that includes, *inter alia*, a salt of hydrofluoric acid and a base not containing a metal (A component) in an amount of 0.01 – 1 mass %, a water-soluble organic solvent that is a mixture of a sulfur-containing compound and polyhydric alcohol or its derivatives (B2 component), phosphonic acid (C1 component) in an amount of 0.1-20 mass %, and a base not containing a metal (E component) in an amount of 0.1-20 mass %.

The cleaning composition of claims 6 and 8 increases the efficiency of the removal of both KrF and ArF resists by the claimed B2 component, which is a mixture of a sulfur-containing compound and polyhydric alcohol or its derivatives (page 13, line 28 to page 14, line 10 of the specification). Further, the combination of 0.1-20 mass % of the C1 component and 0.1 – 20 mass % of the E component increases resistance to corrosion and enables the removal of the resist over a wide pH range of from 2 to 8. Moreover, the claimed compositions increase the removal efficiency of the resist film, resist residue, and etching residue (page 14, line 30 to page 15, line 6; page 16, lines 1-21 of the specification). Amended independent claims 6 and 8 are not anticipated by any of the references cited in the Office Action.

None of Seijo, Tanabe '848, Tanabe '274, Tanabe '000, or Tanabe '063 discloses a cleaning composition for removing resists including phosphonic acid (C1 component), as claimed in amended claims 6 and 8. Moreover, there is no disclosure of the presently

claimed cleaning composition's unique characteristic that the combination of the C1 component and the E component provides excellent corrosion resistance for copper-based metal film and low-k film, a high removal efficiency of resist film, resist residue, and etching residue, and the ability to adjust the pH over a wide pH range of from 2 to 8 (page 14, line 30 to page 15, line 6, and page 16, lines 1-21 of the specification). Accordingly, neither Seijo, Tanabe '848, Tanabe '274, Tanabe '000, nor Tanabe '063 anticipates amended independent claim 6 or 8.

Ikemoto does not disclose a cleaning composition for removing resists that includes a water-soluble organic solvent that is a mixture of a sulfur-containing compound and polyhydric alcohol, or its derivative (B2 component), with the other components claimed in amended claims 6 and 8. Accordingly, amended independent claims 6 and 8 are not anticipated by Ikemoto.

Further, none of the cited references describes the presently claimed invention's unique characteristic that the combination of the sulfur-containing compound and the polyhydric alcohol or its derivatives increases the removal efficiency of both the KrF and ArF resists (page 12, line 28 to page 14, line 10 of the specification). Hsu discloses, for example, sulfoxides, sulfolanes, polyhydric alcohols and other compounds ([0018], [0022]). In contrast to the claimed B2 component, however, Hsu does not disclose the specific combination of the sulfur-containing compound and polyhydric alcohol or its derivatives. Tanabe '848 and Tanabe '000 describe, for example, sulfoxides, sulfones, amides, lactams, lactones, polyhydric alcohols, and the like (Tanabe '848, col. 6, lines 6-34; Tanabe '000, col. 3, lines 3-40). Seijo describes, for example, sulfoxides, amides, lactones, and polyhydric alcohols (Seijo, col. 5, lines 19-59). Tanabe '848, Tanabe '000, and Seijo further describe that at least one of specific glycol, sulfoxide, and amide is selected (Tanabe '848, claims 5 and 8; Tanabe '000, claims 2 and 5, Seijo, col. 5, lines 19-32). However, there is no disclosure of specifying the combination of a sulfur-containing compound and polyhydric alcohol or its derivatives in any of Tanabe '848, Tanabe '274, and Seijo. Because none of Seijo, Tanabe '848, Tanabe '000, Tanabe '000, Tanabe '063, Ikemoto, or Hsu discloses each and every element of amended claims 6 and 8, the rejections cannot be maintained.

For the reasons set forth above, none of the references cited in the Office Action anticipates any of amended independent claims 1, 2, 6, or 8. Since the independent claims

are allowable for the reasons set forth above, the remaining claims, all dependent claims, are allowable because they depend from allowable independent claims.

Dependent claim 3 is allowable not only because it depends from patentable independent claim 1, but also because it recites a limitation that is not disclosed by any of the cited references.

Claim 3 recites a cleaning composition as claimed in claim 1, wherein the water-soluble organic solvent (the B1 component) is a mixture of amides and polyhydric alcohol or its derivatives. This claimed feature increases the efficiency of removal of both KrF and ArF resists (page 9, line 31 to page 10, line 19 of the specification). None of the cited references discloses that the specific combination of amides and polyhydric alcohol or its derivatives, as claimed in claim 3, increases the removal efficiency of both KrF and ArF resists.

In contrast, the stripping composition disclosed in Ikemoto does not contain amides. Accordingly, Ikemoto does not anticipate claim 3.

Tanabe '848, Tanabe '274, Tanabe '000, and Tanabe '063 disclose, for example, sulfoxides, sulfone, amides, lactams, lactones, polyhydric alcohols, and the like (Tanabe '848: col. 6, lines 6-34; Tanabe '274: col. 4, lines 5-43; Tanabe '063: col. 4, lines 7-45; Tanabe '000, col. 3, lines 4-41) and also describe that at least one of a specific glycol, sulfoxide, and amide (or imide) is selected (Tanabe '848, claim 5; Tanabe '274, claim 1; Tanabe '063, claim 5; Tanabe '000, claims 2 and 5). However, neither Tanabe '848, Tanabe '274, Tanabe '000, nor Tanabe '063 discloses the specific combination of amides and polyhydric alcohol or its derivatives, as claimed in claim 3. Accordingly, none of Tanabe '848, Tanabe '274, Tanabe '000, or Tanabe '063 anticipates claim 3.

Hsu discloses amides as corrosion inhibiting compounds ([0014]). Seijo discloses at least one compound including an amide or ether functional group (col. 5, lines 30-40). However, neither Hsu nor Seijo discloses the specific combination of amides and polyhydric alcohol or its derivatives, as claimed in claim 3. Accordingly, Hsu and Seijo do not anticipate claim 3.

For these reasons, in addition to the reasons set forth above for independent claim 1, from which claim 3 depends, the cited references do not anticipate claim 3, and the § 102 rejection of claim 3 should be withdrawn.

*Conclusion*

For the reasons set forth above, reconsideration of the rejections is respectfully requested.

If, in the opinion of the Examiner, a telephone conference would expedite prosecution of the present application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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